

IT IS CLAIMED:

1. A method for detecting the binding of or interaction between each or any of a plurality of ligands and one or more target antiligands, said method comprising:

(a) reacting the antiligand(s) with a set of electrophoretic tag (e-tag) probes, the set comprising  $j$  members, and each of said e-tag probes having the form:

$(D, M_j) - L - T_j$ , where

(i)  $D$  is a detection group comprising a detectable label;

(ii)  $T_j$  is a ligand capable of binding to or interacting with a target antiligand,

(iii)  $L$  is a linking group connected to  $T_j$  by a bond that is cleavable by a selected cleaving agent when the probe is bound to or interacting with the target antiligand, wherein cleavage by said agent produces an e-tag reporter of the form  $(D, M_j) - L'$ , where  $L'$  is the residue of  $L$  attached to  $(D, M_j)$  after such cleavage,

(iv)  $M_j$  is a mobility modifier having a charge/mass ratio that imparts a unique and known electrophoretic mobility to a corresponding e-tag reporter of the form  $(D, M_j) - L'$ , within a selected range of electrophoretic mobilities with respect to other e-tag reporters of the same form in the probe set; and

(v)  $(D, M_j)$ - includes both  $D - M_j$  - and  $M_j - D$  -;

(b) treating the contacted antiligand(s) with the cleaving agent, thereby to produce a mixture of e-tag reporters having the form  $(D, M_j) - L'$ , and uncleaved and/or partially cleaved probes,

(c) exposing said mixture to a capture agent effective to bind to uncleaved or partially cleaved e-tag probes, but not the corresponding e-tag reporters, and effective to

(i) impart a mobility to the probes bound to capture agent that prevents the probes from electrophoretically migrating within said range of electrophoretic mobilities or

(ii) immobilize the probes on a solid support;

(d) fractionating e-tag reporters having the form  $(D, M_j) - L'$  by electrophoresis, to effect separation of the e-tag reporters, and

(e) identifying the electrophoretic mobilities of one or more electrophoretic bands, each band corresponding to an e-tag reporter that is uniquely assigned to a target antiligand.

2. The method of claim 1, wherein  $T_j$  is biotinylated and the capture agent is avidin or streptavidin.

3. The method of claim 1, wherein  $T_j$  contains an antigen and the capture agent is an antibody or antibody fragment that binds specifically to the antigen.

4. The method of claim 1, wherein  $T_j$  contains a particle or mass group that effectively prevents its migration under electrophoretic conditions within the range of electrophoretic mobilities of the e-tag reporters.